Welcome

Office for State, Tribal, Local and Territorial Support
presents

CDC *Vital Signs* Town Hall

Zika in Babies: Opportunities for Monitoring Health and Development

August 14, 2018
2:00–3:00 PM (EDT)

Agenda

Time	Agenda Item	Speaker(s)
2:00 pm	Welcome & Introduction	**José T. Montero, MD, MHCDS** Director, Office for State, Tribal, Local and Territorial Support
2:05 pm	Vital Signs Overview	**Coleen A. Boyle, PhD, MSHyg** Director, National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention
2:15 pm	Presentations	**S. Grace Prakalapakorn, MD, MPH** Associate Professor, Department of Ophthalmology, Division of Pediatric Ophthalmology and Strabismus, Duke University **V. Fan Tait, MD, FAAP** Chief Medical Officer, American Academy of Pediatrics **Meg Fisher, MD, FAAP** Medical Director, The Unterberg Children's Hospital at Monmouth Medical Center and Professor of Pediatrics, Drexel University College of Medicine
2:35 pm	Q&A and Discussion	Dr. José T. Montero
2:55 pm	Wrap-up	
3:00 pm	End of Call	

CDC *Vital*signs™

TOWN HALL TELECONFERENCE

to support STLT efforts and build momentum around the monthly release of CDC *Vital Signs*

Zika in Babies in the US Territories:
Findings from CDC's Latest Vital Signs Report

Coleen Boyle, PhD, MSHyg

Director, National Center on Birth Defects and Developmental Disabilities

Office for State, Tribal, Local, and Territorial Support Town Hall

August 14th, 2018

CDC Vitalsigns™

#vitalsigns
AUG. 2018

4,800 Over 4,800 pregnancies in the US territories had a lab result showing confirmed or possible Zika from 2016-2018.

1 in 7 About 1 in 7 babies had health problems possibly caused by Zika reported, among 1,450 babies at least one year old.

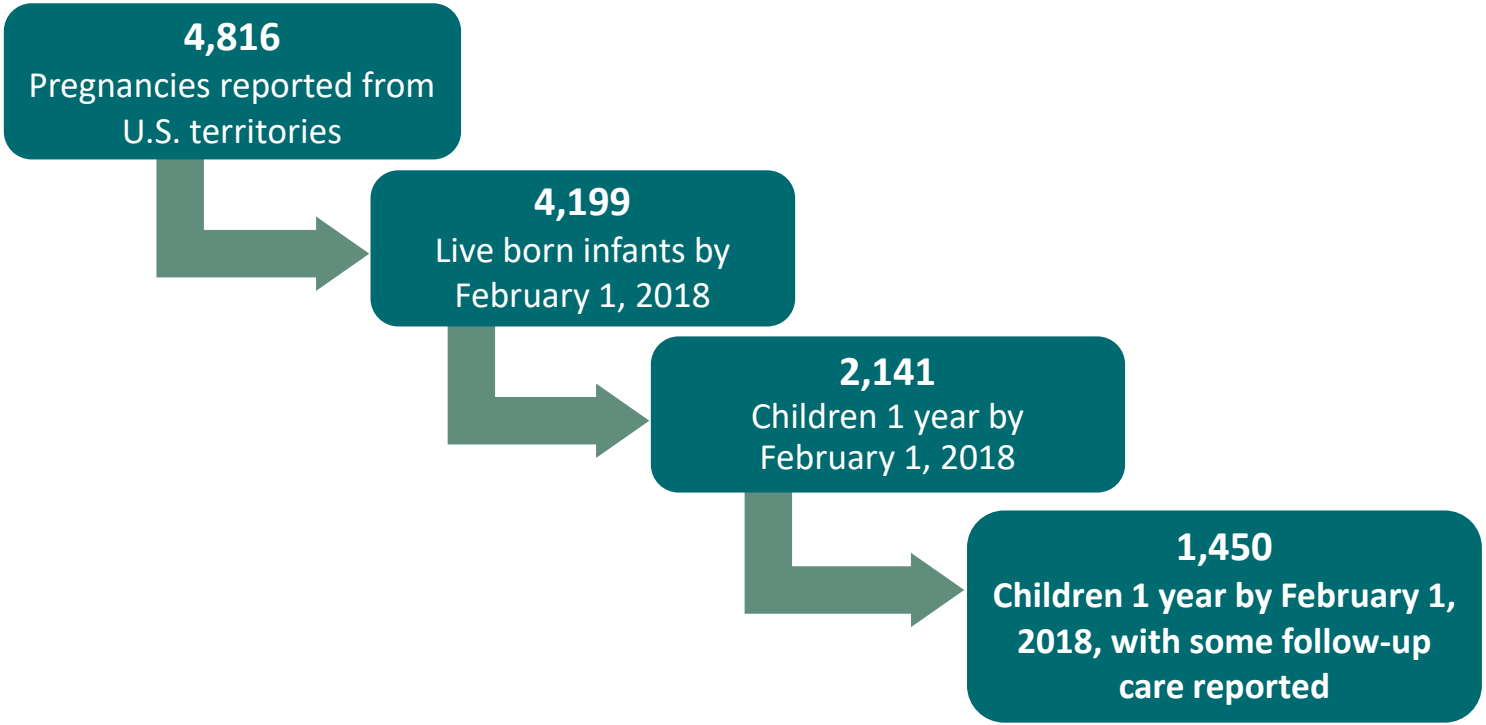
1 in 3 Only 1 in 3 babies had the recommended eye exam reported, among 1,450 babies at least one year old.

Zika in babies in US territories

Monitoring early health and development

Zika virus ("Zika") infection during pregnancy can cause severe health problems in babies, such as birth defects, problems with vision and hearing, seizures, and developmental delays. More than 4,800 pregnancies in the US territories (American Samoa, Federated States of Micronesia, Puerto Rico, Republic of Marshall Islands, US Virgin Islands) had a lab result showing confirmed or possible Zika from 2016-2018. From these pregnancies, 1,450 babies were at least one year old and had some follow-up care reported for this analysis. About 1 in 7 (or 14%) of the 1,450 babies had one or more health problems possibly caused by Zika reported to the US Zika Pregnancy and Infant Registry. Some of these problems were not apparent at birth and were identified as the babies grew older. The full range of long-term health problems caused by Zika will remain unknown until these babies mature. Identifying health problems early can help babies and children get the care they need. For example, only about 1 in 3 (or 36%) of the 1,450 babies at least one year old had an eye exam by an eye doctor as recommended. These exams can help identify vision problems early, so that babies can get glasses or other services they may need. Throughout early childhood,

Population


4,816
Pregnancies reported from U.S. territories
4,199
Live born infants by February 1, 2018
2,141
Children 1 year by February 1, 2018
1,450
Children 1 year by February 1, 2018, with some follow-up care reported

Reported Clinical Care

CDC Clinical Guidance

- CDC released clinical guidance on the evaluation and management of infants with possible congenital Zika virus infection in January 2016.
  - Standard evaluation at birth and well-child visit:
    - Physical exam
    - Newborn hearing screen
    - Developmental monitoring and screening
    - Vision screening
  - Head ultrasound and comprehensive ophthalmologic exam performed by age 1 month

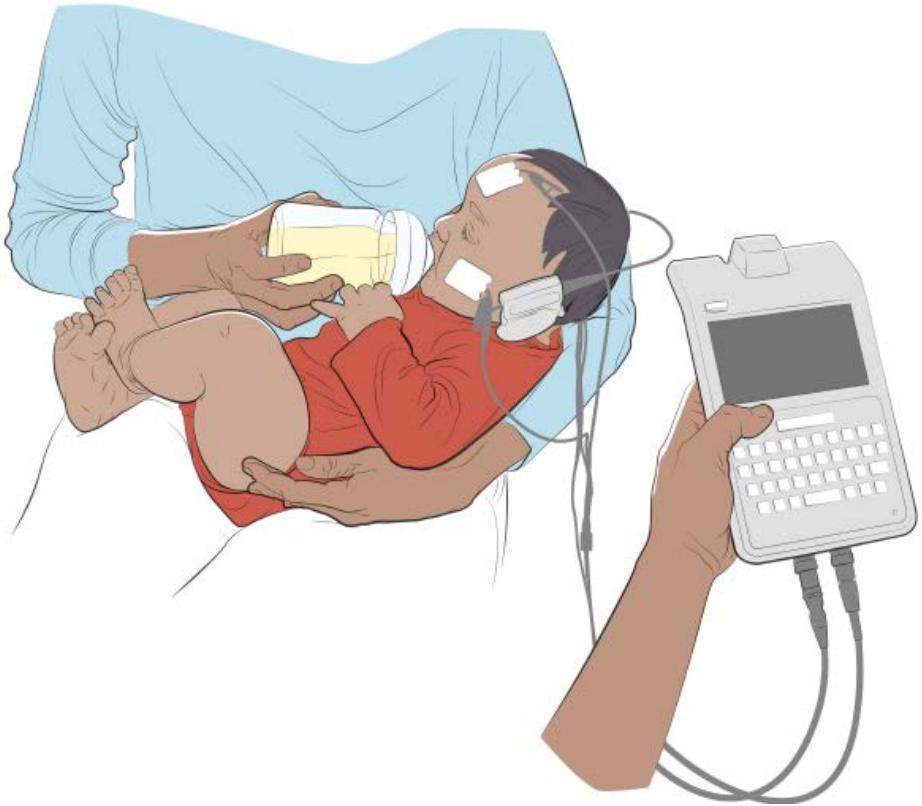
Staples JE 2016; Adebanjo T, 2017
Karoly LA, 2005; Yoshinaga-Itano C, 2017; Sonsken PM, 1991; Ventura LO, 2017; Bright Futures Steering Committee, 2006

Recommended Screening: Physical Examination

95%

of the 1,450 infants included in the analysis had the recommended **physical exam** reported to the USZPIR.

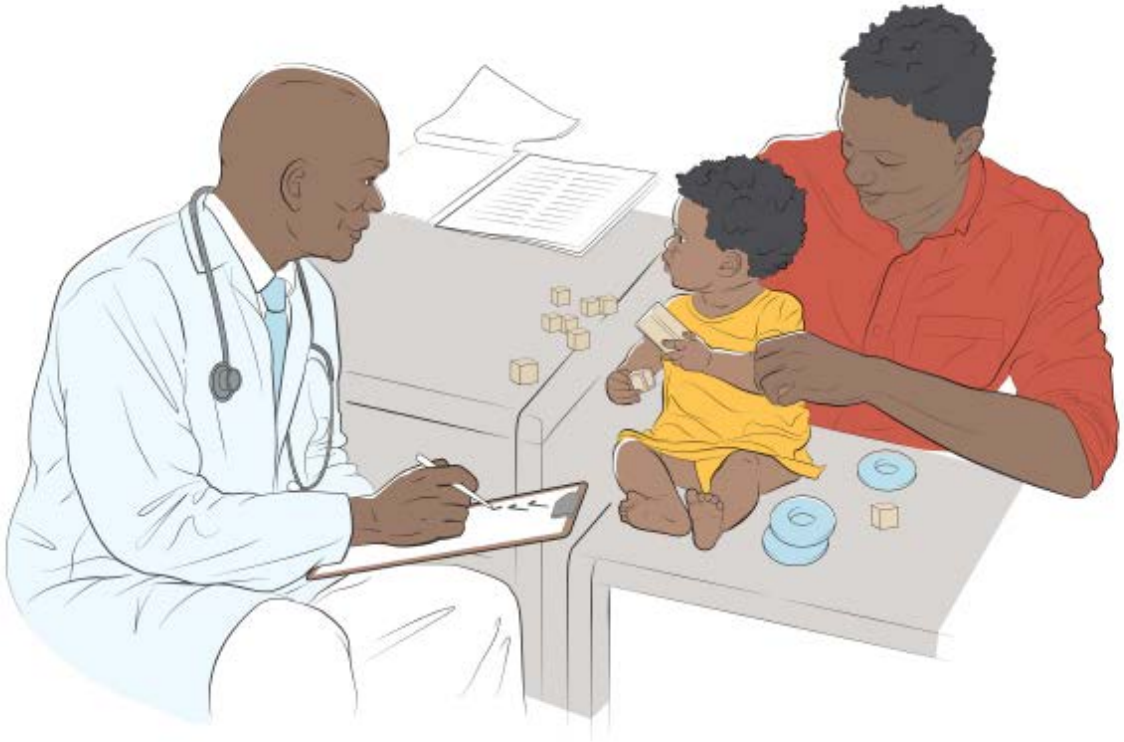
Recommended Screening: ABR-Based Hearing Screening or Evaluation



48%

of the 1,450 infants included in the analysis had the recommended **ABR-based hearing screening or evaluation** reported to the USZPIR.

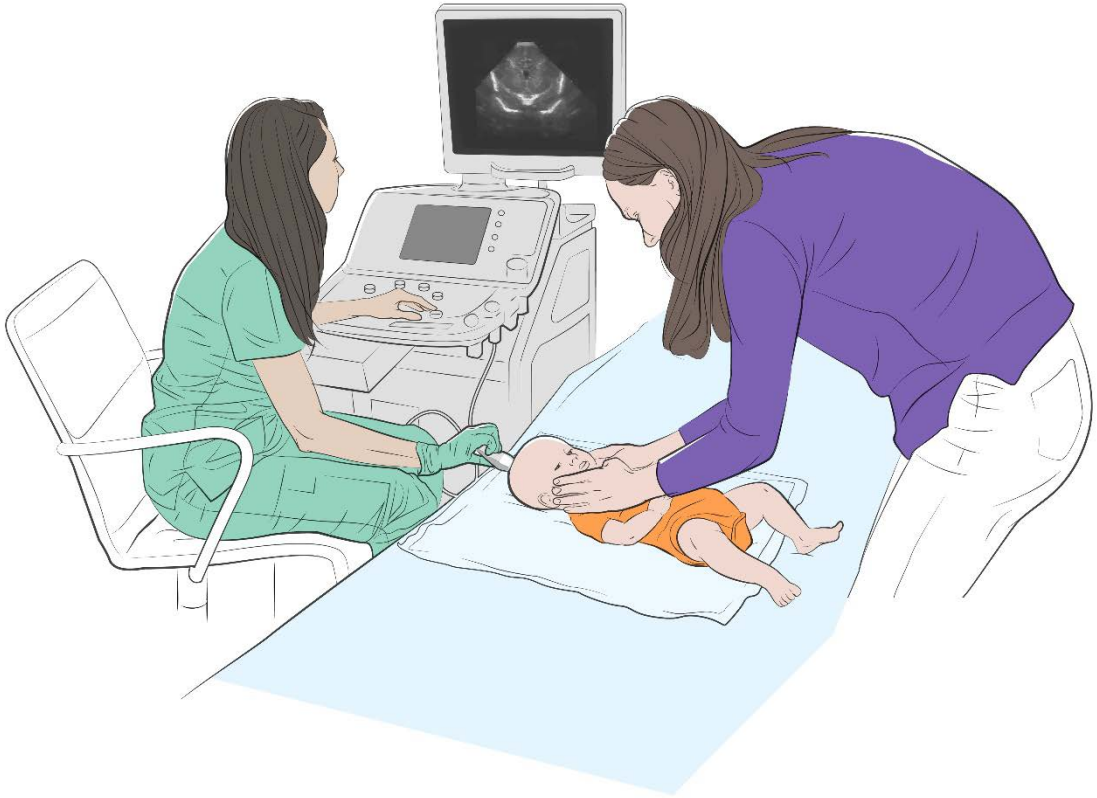
Recommended Screening: Developmental Screening or Evaluation



76%

of the 1,450 infants included in the analysis had the recommended **developmental screening** or evaluation reported to the USZPIR.

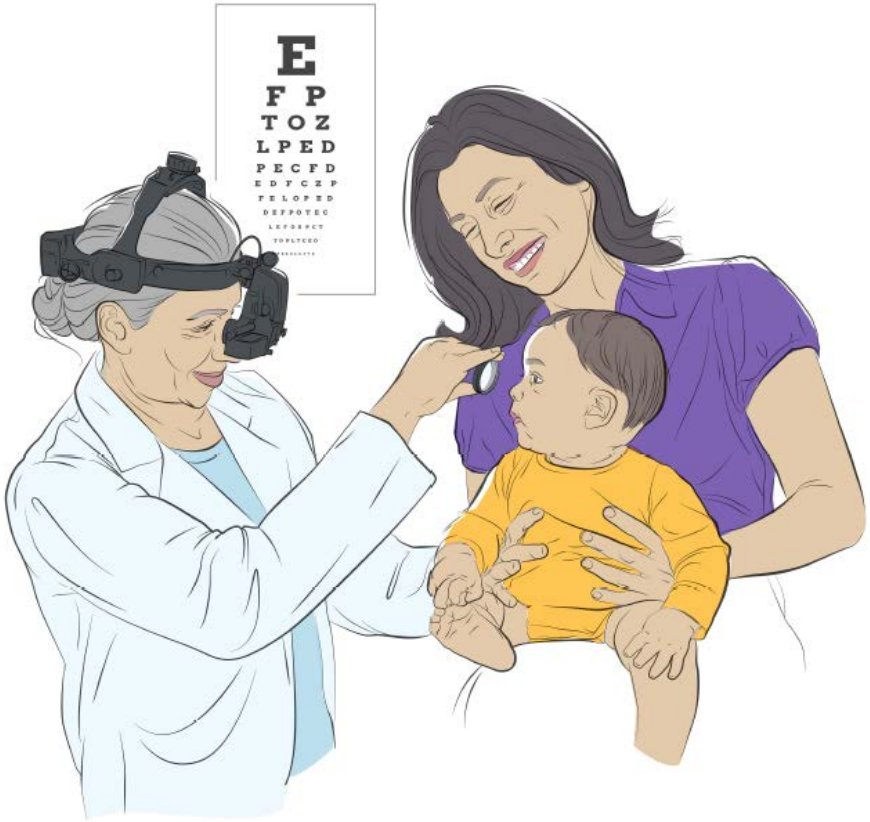
Recommended Screening: Neuroimaging



60%

of the 1,450 infants included in the analysis had the recommended **neuroimaging** reported to the USZPIR.

Recommended Screening: Ophthalmologic Exam by an Ophthalmologist



36%

of the 1,450 infants included in the analysis had the recommended **ophthalmologic exam by an ophthalmologist** reported to the USZPIR.

Adverse Infant Outcomes Assessed

Zika-associated birth defects

- **Microcephaly at birth**

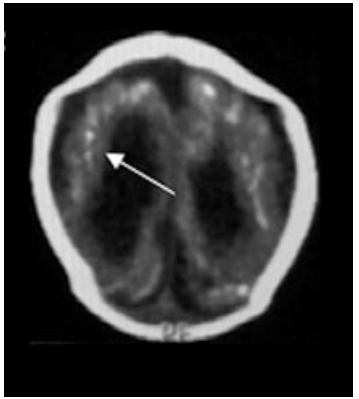
  Birth head circumference <3rd percentile for infant sex and gestational age based on INTERGROWTH-21st online percentile calculator

- **Selected congenital brain anomalies***

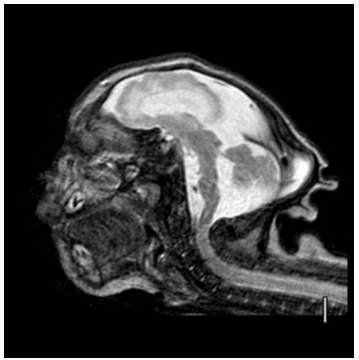
  Intracranial calcifications; cerebral atrophy; abnormal cortical formation (e.g., polymicrogyria, lissencephaly, pachygyria, schizencephaly, gray matter heterotopia); corpus callosum abnormalities; cerebellar abnormalities; porencephaly; hydranencephaly; ventriculomegaly/hydrocephaly

- **Selected congenital eye anomalies**

  Chorioretinal anomalies involving the macula (e.g., chorioretinal atrophy and scarring, macular pallor, and gross pigmentary mottling),excluding retinopathy of prematurity; microphthalmia or anophthalmia; coloboma; cataract; intraocular calcifications; optic nerve atrophy, pallor, and other optic nerve abnormalities.



Subcortical calcifications



Skull collapse

*Neural tube defects removed from original case definition

Neurodevelopmental abnormalities possibly associated with Zika

- Hearing abnormalities
- Congenital contractures
- Seizures
- Body tone abnormalities
- Movement abnormalities
- Swallowing abnormalities
- Possible developmental delay based on standardized screening or evaluation
- Possible visual impairment
- Postnatal-onset microcephaly

Congenital contractures with knee dislocation

Zika-related health outcomes

Outcomes reported among children aged ≥1	From pregnancies with any laboratory evidence of possible Zika virus infection (N = 1,450)
Zika-associated birth defect	87 (6%)
Neurodevelopmental abnormality possibly associated with congenital Zika virus infection	136 (9%)
Zika-associated birth defect and neurodevelopmental abnormality possibly associated with congenital Zika virus infection	20 (1%)
Total with Zika-associated birth defect and/or neurodevelopmental abnormality possibly associated with congenital Zika virus infection	**203 (14%)**

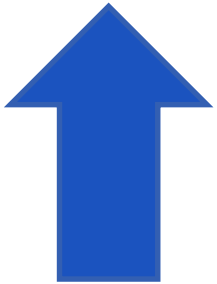
Zika-related health outcomes

Outcomes among children aged ≥1	From pregnancies with any laboratory evidence of possible Zika virus infection (N = 1,450)	From pregnancies with RNA-positive Zika virus infection (N = 943)
Zika-associated birth defect	87 (6%)	62 (7%)
Neurodevelopmental abnormality possibly associated with congenital Zika virus infection	136 (9%)	99 (10%)
Zika-associated birth defect and neurodevelopmental abnormality possibly associated with congenital Zika virus infection	20 (1%)	17 (2%)
Total with Zika-associated birth defect and/or neurodevelopmental abnormality possibly associated with congenital Zika virus infection	**203 (14%)**	**144 (15%)**

Comparison with baseline prevalence

- Zika-associated birth defects (brain and eye only) among liveborn infants before Zika = 0.16%

- 6% with Zika-associated birth defects in this report is about a **30-fold increase** over the baseline



All Zika-exposed children need evaluation

Among 1,386 children who did not have microcephaly at birth

- 822 (59%) were reported to have a neuroimaging exam
  - **14** (~2%) had at least one brain anomaly identified
- 494 (36%) were reported to have an ophthalmology exam
  - **12** (~2%) had at least one eye anomaly identified

Had these infants **not** received neuroimaging or ophthalmologic evaluation, **26** brain or eye anomalies in **23** children might have gone undetected

Limitations

- Data are limited to evaluations and clinical care received and reported to the USZPIR
- Appropriate estimates of baseline frequencies of neurodevelopmental abnormalities among very young children are not available
- Cannot attribute causality of these health problems to Zika virus infection during pregnancy

Implications

- Babies born to mothers with Zika during pregnancy should receive special follow-up care, **even if they appear healthy**
- According to what was reported, many babies did not receive **all** the recommended care
- Without evaluation, some health problems may **not** be detected or treated
- Identifying health problems **early** can help babies and children get the care they need

Monitoring and evaluation of children with congenital Zika virus exposure is **essential** to ensure early detection of and early referral to intervention services that might improve outcomes

What can health departments do?

- Work with healthcare providers to **collect** and **report** medical information about babies in the US Zika Pregnancy and Infant Registry through at least two years of age
- Share CDC **clinical guidance** for mothers and babies affected by Zika, and CDC's **resources** for checking development
- Keep **raising awareness** about the risks of Zika during pregnancy and how people can protect themselves
- **Connect affected families** with support groups and services
- **Encourage communication** between healthcare providers and families

Resources

Vital Signs Website
www.cdc.gov/vitalsigns/Zika-territories

Infant Follow-Up Resources
https://www.cdc.gov/pregnancy/zika/clinician-resources-infants.html

CDC Infant Guidance
https://www.cdc.gov/pregnancy/zika/testing-follow-up/infants-children.html

General Zika Information
www.cdc.gov/zika

Vital Signs MMWR Report
https://www.cdc.gov/mmwr/volumes/67/wr/mm6731e1.htm?s_cid=mm6731e1_w

Zika and Pregnancy Information
https://www.cdc.gov/pregnancy/zika/index.html

Informational Fact Sheets and Videos
https://www.cdc.gov/pregnancy/zika/materials/index.html

Infant Guidance Medscape Video
https://www.medscape.com/viewarticle/899123?src=par_cdc_stm_mscpedt&faf=1

Acknowledgements

- Health department staff in American Samoa, Puerto Rico, U.S. Virgin Islands, Federated States of Micronesia, and Republic of the Marshall Islands
- Domestic Zika Pregnancy and Infant Registry Staff
- CDC staff and Vital Signs MMWR co-authors

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

Congenital Zika Virus Infection: The Importance of Ophthalmologic Screening

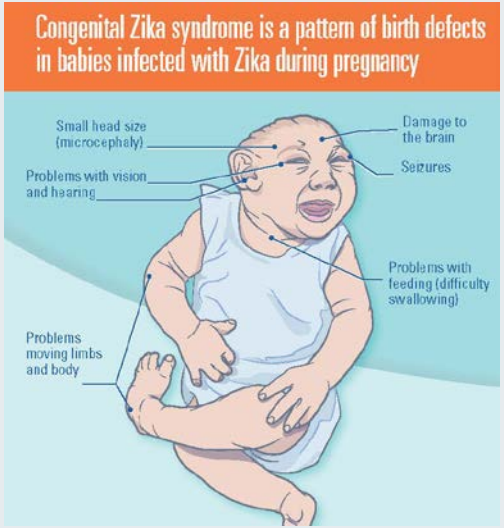
S. Grace Prakalapakorn, MD, MPH
Associate Professor of Ophthalmology & Pediatrics
Duke University, School of Medicine

CDC RECOMMENDATIONS: OPHTHALMOLOGIC SCREENING

Who should be referred for screening and when?

By 1 month of age:

- All infants with abnormalities consistent with congenital Zika syndrome (and whose mothers had possible Zika virus exposure during pregnancy, regardless of maternal testing results), AND
- All infants of mothers with laboratory evidence of Zika virus infection during pregnancy (including infants without abnormalities consistent with congenital Zika syndrome)



Adebanjo T, Godfred-Cato S, Viens L, et al. Update: Interim Guidance for the Diagnosis, Evaluation, and Management of Infants with Possible Congenital Zika Virus Infection - United States, October 2017. *MMWR Morb Mortal Wkly Rep*. 2017 Oct 20;66:1089-

Why do these infants all need to be examined by an Ophthalmologist?

- Ocular abnormalities have been identified in infants both with and without microcephaly
- Abnormalities have been found in the anterior and posterior ocular structures

Photo credit: National Eye Institute

Ocular Anatomy

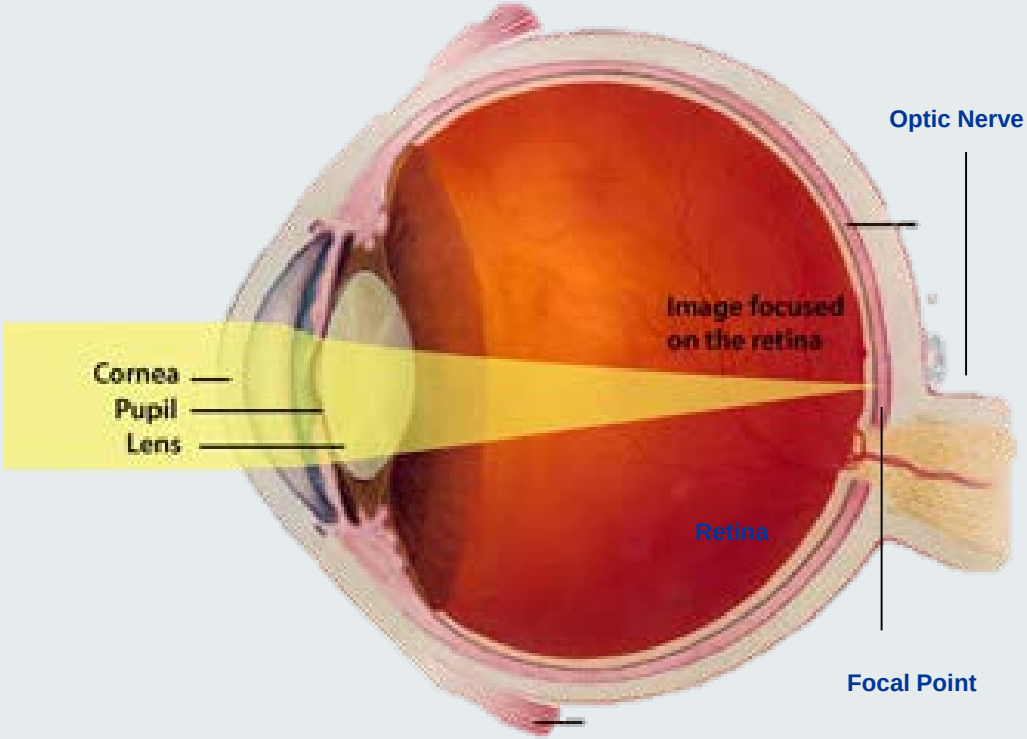
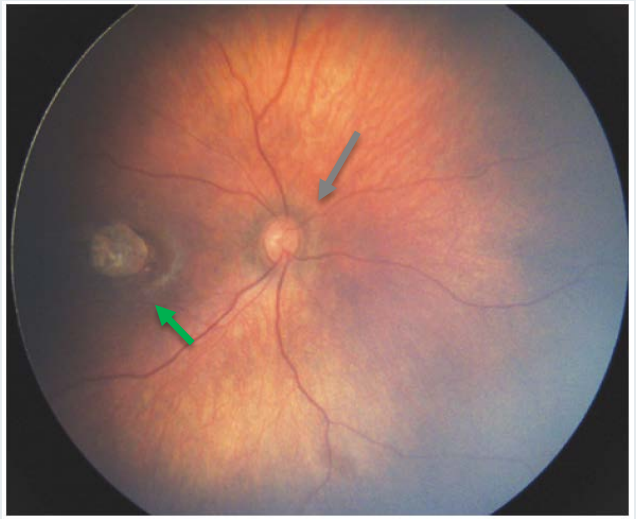


Photo credit: National Eye Institute

OCULAR FINDINGS ASSOCIATED WITH CONGENITAL ZIKA VIRUS INFECTION

Macular and Optic Nerve Findings

- **Commonly reported macular findings**
  - Macular mottling
  - Chorioretinal atrophy
- **Commonly reported optic nerve findings**
  - Hypoplasia
  - Increased cup to disk ratio
  - Pallor



Macular mottling, chorioretinal atrophy, and optic nerve hypoplasia

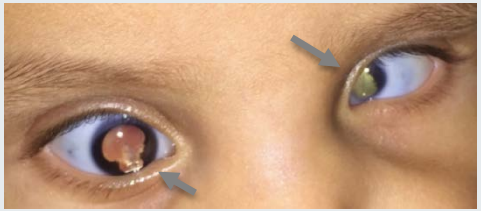
Ventura CV, et al. Ophthalmological findings in infants with microcephaly and presumable intra-uterus Zika virus infection. Arq Bras Oftalmol. 2016 Feb;79(1):1-3.

Other Ocular Findings

- Congenital glaucoma
- Iris colobomas
- Microphthalmia
- Subluxation of the lens
- Cataract
- Intraocular calcification
- Strabismus
- Nystagmus

Iris colobomas

Congenital Glaucoma

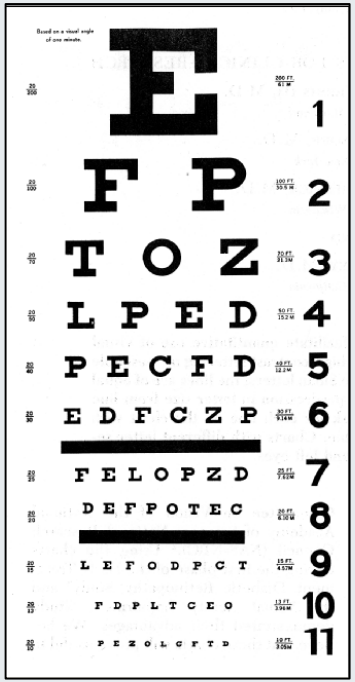


Microphthalmia

- de Paula Freitas, et al. Anterior-Segment Ocular Findings and Microphthalmia in Congenital Zika Syndrome. Ophthalmology. 2017 Dec;124(12):1876-1878.
- Yepez JB, et al. Ophthalmic Manifestations of Congenital Zika Syndrome in Colombia and Venezuela. JAMA Ophthalmol. 2017 May 1;135(5):440-445.

Visual Function

- Of children tested, 100% had visual impairment, while only 30-40% had any ocular abnormalities.
- Cortical visual impairment might be the most common cause of blindness among children with congenital Zika syndrome

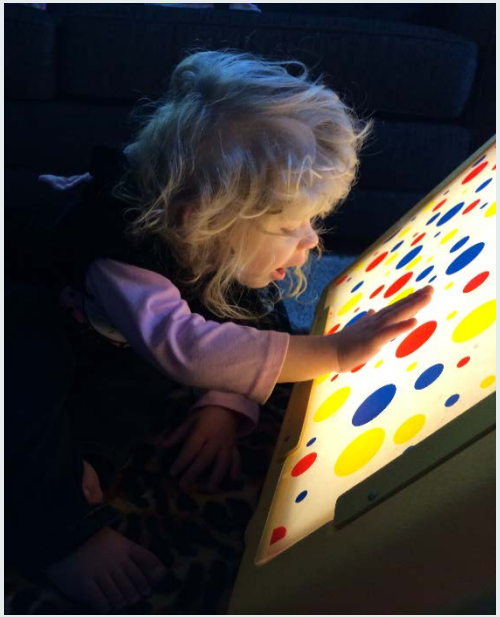


National Eye Institute

- Vercosa I, Carneiro P, Vercosa R, et al. The visual system in infants with microcephaly related to presumed congenital Zika syndrome. J AAPOS. 2017;21:300-304.
- Ventura LO, Ventura CV, Lawrence L, et al. Visual impairment in children with congenital Zika syndrome. J AAPOS 2017;21:295-9.
- Ventura LO, Ventura CV, Dias NC, et al. Visual impairment evaluation in 119 children with congenital Zika syndrome. J AAPOS.

What can be done for a child if an eye problem is identified?

- **Timely Referral:**
  - Low vision specialist
  - Early intervention
- **Treatments:**
  - Glasses



American Printing House for the Blind.

A missed opportunity

- In the US territories, only 36% of infants had an eye exam by 1 y/o
- Timely referral is critical!
- Maximizing visual development can help an infant's overall global development

Image from: https://she.blogs.latrobe.edu.au/2016/05/26/7-tips-handle-exam/white-rabbit/. Last accessed

Why is Ophthalmologic Screening Important?

- Healthy-appearing infants with congenital Zika virus infection may have ocular findings and/or visual impairment
- Cortical visual impairment might be the most common cause of blindness among children with congenital Zika syndrome
- Timely referral to a low vision specialist and early intervention can help an infant's overall global development

Image from: https://forlittleeyes.com/2010/10/22/your-stories-jacks-journey-with-infant-cataracts/. Last accessed 7/23/18

Questions?
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DukeMedicine

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Health Outcomes in Children with Congenital Zika Exposure

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Monmouth Medical Center
Professor of Pediatrics,
Drexel University College of Medicine

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Mission: to attain optimal physical, mental, and social health and well-being for all infants, children, adolescents and young adults.

AAP Zika Activities

- Collaborations
- Articles linking to guidance
- Webinars
- Psychosocial support materials
- Periodic survey
- Project ECHO® Zika

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Project ECHO®

Vital Signs: Relevance for Pediatrics

- Highlights importance of:
  - Zika prevention, anticipatory guidance for families
  - Developmental screening, ongoing monitoring
  - Medical home
- Critical need for enhanced communication between obstetric providers, hospital/birthing facility, neonatologists, and pediatric care providers

Pediatricians' Experiences and Challenges

- May need to take extra steps
- Access to information
- Babies born without abnormalities
- Migration of parents and children

Ongoing Concerns

- Loss to follow-up
- Developmental screening
- Special populations at-risk

Outreach To Pediatricians

- Challenges exist; AAP can help
- Importance of enhancing coordination of care
- Clear communication
- Connection with AAP Chapters

Moving Forward

- Lessons from Zika can inform future response efforts
- Registries/reporting
- EHR/EMR: links from mother's to baby's medical record
- Communications (obstetric providers to hospital/birthing facility/neonatologists to pediatrician)
- Impact of social/societal factors on child outcomes
- Keeping clinicians informed in a crisis

ECHO Sessions as a Model

- ECHO (Extension for Community Healthcare Outcomes)
- Model for telementoring
- Leverage technology to connect specialty care providers with primary care providers
- Facilitate connections, areas with limited pediatric care
- Didactic and case-based presentations

What We Still Don't Know

- Long-term effects of congenital Zika virus infection
- Exact strategies to improve outcomes in infants who develop abnormalities later on
- Subtle clinical findings associated with congenital Zika virus infection

Resources

- AAP Zika Virus Resource Page (www.aap.org/zika)
- AAP Zika Key Information for Pediatricians (www.aap.org/zikakey)
- AAP Project ECHO Zika (www.aap.org/en-us/professional-resources/practice-transformation/echo/Pages/AAP-Project-ECHO-Zika.aspx)
- AAP Children and Disasters Web site (www.aap.org/disasters)
- AAP HealthyChildren.org Zika Virus Info for Parents (www.healthychildren.org/zikavirus)

Contact Information

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Contact the AAP Disaster Preparedness and Response Initiatives staff: DisasterReady@aap.org

CDC Vital Signs Electronic Media Resources

- Become a fan on Facebook
  www.facebook.com/cdc
- Follow us on Twitter
  www.twitter.com/CDCgov
- Syndicate Vital Signs on your website
  https://tools.cdc.gov/medialibrary/index.aspx#/media/id/305883
- Vital Signs interactive buttons and banners
  https://www.cdc.gov/socialmedia/tools/buttons/vitalsigns

Thank You

Provide feedback on this teleconference: OSTLTSFeedback@cdc.gov

Please mark your calendars for the next

Vital Signs Town Hall Teleconference

September 11, 2018

2:00–3:00 PM (EDT)

For more information, please contact Centers for Disease Control and Prevention

1600 Clifton Rd, NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
Email: cdcinfo@cdc.gov
Web: www.cdc.gov